

What is claimed and desired to be secured by Letters Patent is:

1. A method of producing coke from at least one lower grade material on a low pollution or no pollution basis, comprising the acts of:

introducing a mixture of low grade coal fines and another type of carbonaceous fines as an influent into a pyrolyzer;

pyrolyzing the mixture in the pyrolyzer;

discharging coke and pyrolytic by-products as effluents from the pyrolyzer;

separating the pyrolytic by-products into tar and combustible off gas;

using the separated tar as a binder in the mixture, without discharging the tar to the environment;

using the combustible off gas as a source of fuel in the pyrolyzer without discharging the off gas to the environment.

2. A method according to Claim 1 wherein the introducing act comprises obtaining a mixture comprising coal fines and coke fines.

3. A method according to Claim 1 further comprising the act of crushing low grade coal and/or another type of carbonaceous material, prior to the introducing act, to obtain the fines.

4. A method according to Claim 1 further comprising the act of forming the mixture into solid objects prior to the introducing act.

5. A method according to Claim 4 wherein the discharging act comprises discharging the coke as solid objects.
6. A method according to Claim 1 wherein the using act comprises combining the separated tar, a synthetic binder and the mixture of fines prior to the introducing act.
7. A method according to Claim 1 wherein the separated tar is fed back to the mixture prior to the introducing act.
8. A method according to Claim 1 wherein the separating act comprises cooling the by-products and condensing the tar to separate the tar from the off gas.

9. A method of producing coke from at least one low grade material on a low pollution or no pollution basis, comprising the acts of:

- introducing a mixture of low grade coal fines and another type of carbonaceous fines as an influent into a pyrolyzer;
- pyrolyzing the mixture in the pyrolyzer;
- discharging coke and pyrolytic by-products as effluents from the pyrolyzer;
- separating the pyrolytic by-products into tar and combustible off gas;
- using the separated tar as a binder in the mixture without discharging the tar to the environment;
- using the combustible off gas as a source of fuel in the pyrolyzer without discharging the off gas to the environment.

10. A method according to Claim 9 wherein the introducing act comprises obtaining a mixture comprising coke fines and coal fines.

11. A method according to Claim 9 further comprising the act of crushing coke and/or another type of carbonaceous material, prior to the introducing act, to obtain the fines.

12. A method according to Claim 9 further comprising the act of forming the mixture into solid objects prior to the introducing act.

13. A method according to Claim 12 wherein the discharging act comprises discharging the coke from the pyrolyzer as solid objects.

14. A method according to Claim 9 wherein the using act comprises combining the separated tar, a synthetic binder and the mixture of fines prior to the introducing act.

15. A method according to Claim 9 wherein the separated tar is fed back to the mixture prior to the introducing act.

16. A method according to Claim 9 wherein the separating act comprises cooling the by-products and condensing the tar to separate the tar from the off gas.

17. A method of producing coke from low grade coal and waste coke fines on a low pollution or no pollution basis, comprising the acts of:

introducing a mixture of lower grade coal fines and waste coke fines as an influent into a pyrolyzer;

pyrolyzing the mixture in the pyrolyzer;

discharging segregated coke, on the one hand, and pyrolytic by-products comprising combustible off gas and tar on the other hand, as effluents from the pyrolyzer;

separating the pyrolytic by-products into segregated tar and combustible off-gas;

using the segregated tar as a binder in the mixture without discharging the tar to the environment;

using the segregated combustible off gas as a source of fuel in the pyrolyzer without discharging the off gas to the environment.

18. A method according to Claim 17 further comprising the act of crushing oversized waste coke and/or oversized low grade coal, to obtain the fines.

19. A method according to Claim 17 further comprising the act of forming the mixture into solid objects prior to the introducing act.

20. A method according to Claim 19 wherein the discharging act comprises discharging the coke from the pyrolyzer as solid objects.

21. A method according to Claim 17 wherein the using act comprises combining the separated tar, a synthetic binder and the mixture of fines in a mixer.
22. A method according to Claim 17 wherein the separated tar is fed back to the mixture of fines.
23. A method according to Claim 17 wherein low grade coal comprises 20-40% by weight of the mixture.
24. A method according to Claim 17 wherein petroleum coke comprises 40-70% by weight of the mixture.
25. A method according to Claim 17 wherein coke breeze comprises 5-10% by weight of the mixture.
26. A method according to Claim 17 wherein the pyrolyzing act comprises heating the introduced mixture to a temperature within the range of 800-1100°C at a rate within the range of 1500-2000°C/hour to lower coke volatility below 2%.
27. A method according to Claim 17 wherein the separating act comprises cooling the by-products to about 300°C and condensing the tar to separate the tar from the off gas.

28. A method of producing coke on a low pollution or no pollution basis comprising the acts of :

introducing at least one source of carbon comprising low grade coal fines as an influent into a pyrolyzer;

pyrolyzing the fines in the pyrolyzer;

discharging coke, and pyrolytic by-product comprising combustible off gas, and tar as effluents from the pyrolyzer;

condensing the tar;

using the tar as a binder for coal fines without discharging the tar to the environment;

using the combustible off gas as a source of fuel in the pyrolyzer without discharging the off gas to the environment.

29. A method of producing coke on a low pollution or no pollution basis comprising the acts of:

introducing at least one source of carbon comprising waste coke fines and/or coal fines as an influent into a pyrolyzer;

pyrolyzing the fines in the pyrolyzer;

discharging coke, and pyrolytic by-products comprising combustible off gas, and tar as effluents from the pyrolyzer;

condensing the tar to separate the tar and off gas;

using the tar as a binder for the fines without discharging the tar to the environment;

using the combustible off gas as a source of fuel in the pyrolyzer without discharging the off gas to the environment.

30. A method according to Claim 29 wherein all condensed tar is utilized as binder and all combustible off gas is used to fuel the pyrolyzer.

31. A method according to Claim 29 wherein the condensed tar is the sole binder source and the combustible off-gas is the sole source of fuel for the pyrolyzer.